

14

CLEVELAND HARBOR, OHIO.

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LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS ON PRELIMINARY EXAMINATION AND SURVEY OF CLEVELAND HARBOR, OHIO, WITH A VIEW TO THE COMPLETION OF THE EAST BREAKWATER AND SHORE ARM, INCLUDING ANY PLAN FOR COOPERATION ON THE PART OF THE CITY OF CLEVELAND.

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APRIL 9, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration.

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WAR DEPARTMENT,  
*Washington, April 8, 1914.*

RE: SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Chief Engineers, United States Army, dated 7th instant, together with copies of reports from Maj. Chas. S. Bromwell, Corps of Engineers, dated July 22, 1913, and February 10, 1914, with map, on preliminary examination and survey of Cleveland Harbor, Ohio, made by him in compliance with the provisions of the river and harbor act approved March 4, 1913.

Very respectfully,

LINDLEY M. GARRISON,  
*Secretary of War.*

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WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington, April 7, 1914.*

To: The Chief of Engineers, United States Army.

The Secretary of War.

Subject: Preliminary examination and survey of Cleveland Harbor, Ohio.

. There are submitted herewith, for transmission to Congress, reports dated July 22, 1913, and February 10, 1914, with map, by

Maj. Charles S. Bromwell, Corps of Engineers, on preliminary examination and survey authorized by the following item contained in the river and harbor act approved March 4, 1913:

Cleveland Harbor, Ohio, with a view to the completion of the east breakwater and shore arm, including any plan for cooperation on the part of the city of Cleveland.

2. As modified from time to time, the project for improvement of Cleveland Harbor now provides, among other things, for a breakwater approximately parallel with and at an average distance of 3,500 feet from the shore and extending 4,000 feet westerly and about 21,000 feet easterly from the main entrance; the westerly arm connected with the shore by a breakwater 3,130 feet long, and the easterly arm to terminate in a pierhead, with a detached shore arm beginning in a pierhead 500 feet distant and extending shoreward at an angle of 45 degrees with the main breakwater. At the time of the preliminary examination, the officials of the city of Cleveland had proposed a plan of improvement involving the omission of the eastern shore arm and a corresponding extension of the east breakwater, provided that the city of Cleveland build at its own expense a jetty from shore in lieu of the shore arm to be omitted. Further study of the plan by the city officials has, however, resulted in changing the attitude toward it, and it appears that the local authorities are now prepared to cooperate in the work.

3. After further consideration of the problem, the district officer is of the opinion that the broadest interests will be most advantageously served by the ultimate completion of the harbor under a plan contemplating the termination of the main breakwater at a point off shore from the westerly limit of Gordon Park, which work will be completed under an existing contract, the construction of a pierhead to mark the easterly end of this extension, and the construction of a second pierhead 700 feet distant therefrom and a shore arm 1,900 feet long with a spur 240 feet long extending easterly from its inner end along the harbor line. The estimated cost of the part of the work not already under contract is \$497,000. The district officer of opinion, however, that not all of this work is at present necessary and he recommends that no work be done in the near future except the construction of the proposed pierhead to mark the end of the main breakwater, which is estimated at \$50,000, and can be built with funds already provided as there is an available balance of \$81,000. The division engineer concurs in general with the views of the district officer, provided, however, that the construction of the breakwater, shore arm and its pierhead should not be considered worthy until there had been some actual development for commercial purposes in the east half of the east outer harbor.

4. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated March 10, 1914. The board states that the information submitted indicates that there is now considerable diversity of local opinion as to the best arrangement for the east end of the harbor. In view of these conditions, it does not seem advisable to fix the details of the work too far in advance nor to include in the project any work beyond that now required to meet the needs of present and prospective commerce. The board therefore does not concur with the district officer in his recommendation for that part of the project relating to the shore arm, which he proposes to hold

beyance until some future time, but it does concur in his opinion that it is advisable to protect and mark the end of the east breakwater with a pierhead.

5. After due consideration of the above-mentioned reports, I concur with the views of the Board of Engineers for Rivers and Harbors except as to the elimination of the shore arm from the project. A shore arm will certainly be necessary in order to permit the full use of the area that ought to be sheltered by the breakwater. It may be necessary also to intercept the sand movement along the shore and prevent large deposits in what will finally be the sheltered area. I commend the construction of a pierhead on the end of the east breakwater at an estimated cost of \$50,000, to be paid for from the funds now on hand, and that the construction of a shore arm, while remaining a part of the plan of improvement, shall not be undertaken till future development renders it necessary.

DAN C. KINGMAN,  
*Chief of Engineers, United States Army.*

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#### REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS ON SURVEY.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,  
*March 10, 1914.*

the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. The act of March 4, 1913, orders a preliminary examination of Cleveland Harbor, Ohio, with a view to the completion of the east breakwater and shore arm, including any plan for cooperation on the part of the city of Cleveland.
2. The existing project for the improvement of Cleveland Harbor apparently provides, among other items, for the extension of the east breakwater about 15,600 feet, terminating in a pierhead, and for a shore arm about 1,600 feet long, also with a pierhead, leaving an opening 500 feet wide. The extension is nearing completion, but no work has been done toward the construction of the shore arm, and there appears to be some uncertainty as to the details of the work involved in the present project at the east end of the harbor. The district officer states there is on hand an unpledged balance of about \$1,000. His investigations in connection with the preliminary report elicited the information that the city of Cleveland desired a modification of the present plan for the eastern entrance to the harbor omitting the proposed shore arm at the western end of Gordon Park and extending the east breakwater in prolongation of its axis a distance equal to the length of the shore arm. The city proposed to cooperate in the new plan by the construction of a shore arm, consisting of a pier starting from the shore near the eastern end of Gordon Park and extending out to a suitable distance from the end of the prolonged breakwater. It appeared that the modification suggested would be advantageous both to the city of Cleveland and to the United States, and a survey and estimate was ordered.
3. As a result of further inquiry in connection with the survey the district officer found that the city of Cleveland is no longer disposed

to undertake the work it formerly proposed, so that its plan for modification of the present project must be abandoned.

4. The district officer considers it desirable, however, to have a definite plan for the improvement at the east end of the harbor, and he presents one for constructing a pierhead at the end of the east breakwater after the completion of the present contract for its extension, and the construction of a shore arm beginning with a second pierhead at a point 700 feet distant from the one just mentioned and extending 1,960 feet to a point at the westerly end of the harbor line at Gordon Park, with a spur 240 feet in length extending eastward from its inner end, at a total estimated cost of \$497,000. The district officer recommends the adoption of this project, but for the present proposes only the construction of the pierhead at the end of the east breakwater, at a cost of \$50,000, leaving the construction of the shore arm to be taken up at some time in the future when it is more urgently needed. The division engineer concurs generally in the views of the district officer, with the proviso, however, that the construction of the shore arm and its pierhead should not be considered worthy until there has been some actual development for commercial purposes of the east half of the east outer harbor.

5. From the information in hand it appears that the outer harbor front of Cleveland is practically undeveloped for some miles east of East Ninth Street, and at the present rate of development it will be a number of years before the area now protected by the east breakwater will be occupied. The plans of the city have undergone a decided change in the past six months regarding this matter, and the information submitted indicates that there is now considerable diversity of local opinion as to the best arrangement for the east end of the harbor. In view of these conditions it does not seem advisable to fix the details of the work too far in advance or to include in the project any work beyond that now required to meet the needs of present and prospective commerce. The board therefore does not concur with the district officer in his recommendation for that part of the project relating to the shore arm, which he proposes to leave in abeyance until some future time, but it does concur in his opinion that it is advisable to protect and mark the end of the east breakwater with a pierhead.

6. The board therefore reports that in its opinion it is advisable to modify the project for the east end of the outer harbor at Cleveland, Ohio, so as to omit the shore arm and to complete the east breakwater with a pierhead, at an estimated cost of \$50,000, for which funds are now available.

7. In compliance with law, the board reports that there are no questions of terminal facilities, water power, or other subjects related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

W. M. BLACK,  
Colonel, Corps of Engineers,  
Senior Member of the Board

## PRELIMINARY EXAMINATION OF CLEVELAND HARBOR, OHIO.

UNITED STATES ENGINEER OFFICE,  
*Cleveland, Ohio, July 22, 1913.*

From: The District Engineer Officer.  
To: The Chief of Engineers, United States Army  
(Through the Division Engineer).  
Subject: Report on preliminary examination Cleveland Harbor.

1. The river and harbor act approved March 4, 1913, contains the following provision:

The Secretary of War is hereby authorized and directed to cause preliminary examinations to be made at the following-named localities \* \* \* Cleveland Harbor, Ohio, with a view to the completion of the east breakwater and shore arm, including any plan for cooperation on the part of the city of Cleveland. \* \* \*

This duty was assigned this office by department letter of March 1913.

2. The harbor of Cleveland is located on the south shore of Lake Erie about 100 miles by water easterly from Toledo, Ohio, and about 5 miles southwesterly from Buffalo, N. Y. It consists of two distinct portions: The outer harbor comprises the lake front for a distance of about 5 miles, which front is protected to a greater or less extent by breakwaters built by the Government; the inner harbor comprises the lower Cuyahoga River for a distance of  $5\frac{1}{2}$  miles, together with connecting slips, the most important of which is known as the Old River bed. In its original condition Cuyahoga River, while providing a depth of some 15 feet, was closed to navigation for the greater part of each year by a sand bar which formed at its mouth.

3. The improvement of Cleveland Harbor was first undertaken by the Government in 1825. The river and harbor act approved March 3 of that year provided funds sufficient for beginning the construction of parallel piers designed to rectify the natural channel and confine it sufficiently to insure its maintenance by scour at a depth of 12 feet below mean lake level. Work under this general project was completed in 1852. At that time the east and west piers were 1,400 feet and 1,800 feet long, respectively, and a channel 15 feet wide and 13 feet deep below mean lake level had been secured. In 1865 a survey was made and a project adopted which provided for extending the east pier 575 feet and the west pier 500 feet; for repairing the older structures, and for deepening the channel to not less than 14 feet. Work under this project was completed in 1875.

In June 6, 1875, the Secretary of War approved the recommendations of a board of engineer officers, who were appointed to consider an and estimate for a harbor of refuge, submitted by the district engineer under authority of the river and harbor act of June 23, 1874. Construction of this harbor of refuge, with the subsequent modifications of the plan, is regarded as a part of the existing project. Originally planned it included the following works: A breakwater bearing north  $10^{\circ}$  west from the shore at a point about 5,400 feet easterly from the west pier, a distance of 2,400 feet, to an angle, hence easterly approximately parallel with the shore a distance of about 4,700 feet; and an extension to the west pier about 600 feet, terminating about 300 feet from the easterly end of the west breakwater, thus forming an entrance to the harbor. The first

1,000 feet of the breakwater was to be pile construction and the remaining portion was to be built of stone-filled timber cribs placed on a spreading stone foundation. The modified plan located the initial point of the breakwater 200 feet farther west, extended the shore arm to a total length of 3,140 feet due north (magnetically) shortened the parallel portion of the breakwater to 4,000 feet, and required an extension of the west pier a distance of 1,000 feet instead of 600 feet. Work under this project was begun in 1875.

In 1882 the plan was again modified by providing for the extension of the east pier instead of the west pier and for the construction of a spur pier 100 feet long extending northerly normal to the west breakwater at a point 200 feet from its easterly extremity. Work under this project, except the extension of the east pier, was completed in 1883.

A further modification of the project for completing the harbor was adopted by the river and harbor act of August 5, 1886. The plan then proposed was, however, again changed by authority of the river and harbor act of August 11, 1888. According to the final plan the extension of the east pier to close the harbor was abandoned and instead it was proposed to build an east breakwater, beginning 500 feet from the easterly end of the west breakwater, thence extending in prolongation thereof a distance of 3,500 feet, thence deflecting about 20° toward the shore for a further distance of 2,000 feet.

In 1895 an opening 200 feet in width and 13 feet deep below mean lake level was made in the shore arm of the west breakwater by authority of the Secretary of War.

The river and harbor act of June 3, 1896, adopted the following project: Renewing the portion of the east pier outside the harbor line, 322 feet in length; renewing the west pier north of the Lake Shore & Michigan Southern Railway bridge, a length of 1,478 feet; extending the west pier 260 feet south from the Lake Shore & Michigan Southern Railway bridge, in connection with widening the river in that vicinity; dredging in the river both above and below the bridge; repairing the west breakwater outside the opening in the shore arm, a length of 5,440 feet; and sheathing face of cribs in the east breakwater, for a distance of 2,764 feet. The report upon which this project was based was published in House Document No. 326, Fifty-fourth Congress, first session, and republished in the report of the Chief of Engineers for 1896, pages 2949 to 2953.

In compliance with a concurrent resolution made by Congress dated December 21, 1898, a plan was submitted for dredging the entrance channel and basins. Two estimates were submitted, one for dredging to depth of 21 feet and one for dredging to depth of 25 feet. This project was adopted by the river and harbor act of May 3, 1899, but without specific approval as to the depth to which the harbor should be deepened. The river and harbor act of June 1902, however, provided for dredging to a depth of 25 feet in part of the harbor in the discretion of the Secretary of War. The report upon which this project is based was published in House Document No. 156, Fifty-fifth Congress, third session, and reprinted in the report of the Chief of Engineers for 1899, page 3075.

The river and harbor act of June 6, 1900, authorized a preliminary examination and survey of Cleveland Harbor, the report of which was published in House Document No. 118, Fifty-sixth Cong.

econd session, and reprinted in the report of the Chief of Engineers for 1901, page 3278. The plan therein contained included the following: The protection of the main entrance by constructing two breakwaters, each 1,250 feet long, beginning at points on the existing breakwater on either side of the opening, thence extending outward in converging directions and terminating in two pierheads located 100 feet distant from each other; the reinforcement of a portion of the lake faces of the east and west breakwaters; the removal of 200 feet of the westerly end of the east breakwater to provide a clear opening of 700 feet; the construction of an extension of the east breakwater, beginning at the inner end of the inclined arm of the existing structure, thence extending eastward a distance of 15,600 feet and terminating in a pierhead; the construction of a pierhead and a detached breakwater 1,600 feet long, extending shoreward at an angle of about  $45^{\circ}$ , so located as to close in the easterly end of the harbor at a point opposite the westerly line of Gordon Park and to leave an opening of 500 feet as a harbor entrance. This project was adopted by the river and harbor act of June 13, 1902, except that the plan for the extension of the east breakwater was modified to the extent of requiring it to be built in prolongation of the center line of the existing breakwaters, and that no further extension of the inclined arm of the east breakwater should be built, though it had not been completed as contemplated by the project earlier adopted. This act further provided that the east breakwater extension should be commenced at the westerly end and be extended far eastward as available funds would permit.

The river and harbor act of March 2, 1907, adopted a project for building a wharf and storehouse in front of property owned by the United States near the foot of East Ninth Street. This project was based upon a report printed in House Document No. 270, Fifty-ninth Congress, second session.

The river and harbor act of 1910 provided for the removal of the deflecting arm of the old east breakwater and for the construction of a section of breakwater to connect the old work with the new extension.

Under the various projects above enumerated the following work has been accomplished: The construction and repair of the west breakwater; the construction of the east breakwater as originally planned; the construction of pierheads and protecting breakwater as at the main entrance; the widening of the main entrance to 700 feet by removing 200 feet of the east breakwater; the construction, construction, and repair of piers and widening the channel below the Lake Shore & Michigan Southern Railway bridge; deepening the east basin, the entrance channel, and a portion of the east basin to 10 feet below mean lake level; the construction of a wharf on United States property; maintenance of works as necessary and works now in progress, viz, removing the old east breakwater arm and closing the gap under a contract now about 84 per cent completed; and the extension of the east breakwater for an additional length of about 3,600 feet, 10,000 of which was completed under earlier contracts, and 6,500 feet is now about 74 per cent completed under an existing contract. The total amount expended by the United States for the improvement of Cleveland Harbor to June 30, 1913, was \$7,109,731.44,

of which \$586,052.06 has been for maintenance during the past years.

5. The commercial development of Cleveland Harbor has taken place in two distinct localities. The lower Cuyahoga River and the Old River bed are largely used for the transfer of packet freight, iron ore, and coal between rail and water. The upper Cuyahoga River has been developed to a great extent by industrial plants which receive bulky freight by water, notably iron and steel manufacturers. This development has become very important within the past five years. Blast furnaces are operated in this vicinity by the American Steel & Wire Co., the Cleveland Furnace Co., the Upson Nut Co., and the Corrigan-McKinney Co. The last-named concern is now extensively increasing their plant, and the Otis Steel Co. has begun work on a plant which it is understood will involve an expenditure of \$10,000,000.

The outer harbor development has been almost entirely confined to that portion of the lake front between West Fifty-eighth and East Ninth Streets. In the west basin the Pennsylvania Railroad operates a modern ore unloading plant, and the Great Lakes Dredge & Dock Co. maintains a repair yard for its plant. Just east of the river mouth are located three slips where a considerable coal-loading and packet-freight business is done. At East Ninth Street the city of Cleveland has built two piers which have been used only for the convenience of small pleasure craft and the winter mooring of vessels. They have now been leased to passenger-boat companies, however, and it is expected that by next season an important passenger and packet-freight business will be transacted at this point. East of East Ninth Street there is but one commercial dock, that built and used by the Lake Shore Saw Mill and Lumber Co.

The future development of Cleveland Harbor may be predicted with some measure of assurance. From its natural advantages it is likely that the river valley will be increasingly occupied by industrial plants requiring water transportation facilities. The outer harbor, on the other hand, is better adapted to docks for the transfer of commodities between rail and water. The considerable frontage owned by the Lake Shore & Michigan Southern and Pennsylvania railroads will in all probability be ultimately developed along such lines. Some of the manufacturing plants which now occupy the frontage, such as the Otis Steel Co. and the American Steel & Wire Co. may be expected to utilize the harbor for the receipt of materials and the shipment of their products, but it is not believed that industrial development is likely to be extensive in this vicinity.

6. The traffic of Cleveland Harbor is indicated by the following figures: In 1912, 8,161 vessels with an aggregate net registered tonnage of 18,329,073 entered or left the harbor; of this number 45 per cent were loaded with freight, 12.3 per cent carried passengers and merchandise, and 42.7 per cent were light; of the loaded tonnage, 52 per cent carried iron ore, 22.6 per cent carried coal, 1.1 per cent carried grain, 1.4 per cent carried lumber, and 22.9 per cent carried miscellaneous freight; of the tonnage of vessels carrying iron ore, 19 per cent was of vessels of 5,000 net registered tons or over, 63.4 per cent of vessels of 3,000 to 5,000 tons, and 17.6 per cent was of vessels of 1,000 to 3,000 tons; of the tonnage of vessels carrying coal, 1 per cent was of vessels of 5,000 net registered tons or over, 50

cent was of vessels of 3,000 to 5,000 tons, 34.8 per cent was of vessels of 1,000 to 3,000 tons, and 3.3 per cent was of vessels of less than 1,000 tons; 14,296,078 tons of freight were handled, of which 3,909,617 were iron ore and 3,652,907 were coal; the estimated value of freight was \$75,250,000. The tendency toward the use of large carriers is very marked; of the total net registered tonnage for the eight important harbors in this district, the percentage comprised of vessels of 5,000 tons and over, has increased from about 17 per cent to about 23 per cent in the last five years. At Cleveland during the season 1912, 82 per cent of the iron ore and 62 per cent of the coal was handled in vessels of more than 3,000 net registered tons, and 309 cargoes were handled by the largest type of lake vessels—those 500 feet or more in length.

Following are the receipts, shipments, and estimated value of freight for the past five years:

Year.	Receipts. Short tons.	Shipments. Short tons.	Value.
08.....	5,290,000	4,868,847	\$82,492,000
09.....	7,789,000	4,604,000	86,428,000
10.....	8,051,000	5,335,000	69,850,000
11.....	6,023,000	4,927,000	59,873,000
12.....	9,826,000	4,470,000	75,250,000

It will be noted that the business of the harbor, while subject to fluctuations resulting from varying trade conditions, has increased steadily. The range in the estimated values of freight is largely due to the difficulty experienced in obtaining correct figures for the packet freight. On this account the values stated are regarded as somewhat unreliable. With the improvement of terminal facilities in progress and the industrial expansion which is taking place in Cleveland, there is every reason to anticipate a continued growth in the commerce of the harbor.

7. The scope of the present examination, as defined by the law, is limited to the consideration of a plan for completing the harbor by using its easterly end, and of any proposal for cooperation in the work on the part of the city of Cleveland. A general investigation of the subject has been made. Inquiries were directed to the Cleveland Chamber of Commerce, the Lake Carriers' Association, and to the city officials. A public hearing was also held, the minutes of which accompany this report.

8. The plan for completing the harbor, published in House Document No. 118, Fifty-sixth Congress, second session, included the extension of the east breakwater approximately parallel with the shore, a distance of 15,600 feet (measured from a point near East Ninth Street), terminating in a pierhead; and a detached breakwater beginning at a second pierhead to mark the southerly side of an easterly entrance and running shoreward at an angle of about  $45^{\circ}$  a distance of 1,600 feet to a point opposite the westerly line of Gordon Park. This plan was adopted by Congress, with the proviso, however, that the extension be built in prolongation of the existing breakwater or on a line approximately 900 feet farther from shore than at first proposed, although no corresponding revised estimate of cost was made, due to its location in deeper water.

While it has been understood that it was the intent of the law to adopt the general scheme of harbor improvement indicated by the original plan—that is, an extension of the breakwater and the construction of a detached shore arm—yet the absence of a revised estimate of quantities and costs makes the length of the extension uncertain and the length and location of the shore arm indefinite. Following the apparent intent of the law, as indicated by river and harbor acts of 1902 and 1907, the funds thus far appropriated for this project have been applied to the extension of the main breakwater, it now being understood that the ultimate length of this extension will be determined by Congress. The originally estimated cost of the entire project, which included also the protection of the main entrance, was \$4,481,456. There has thus far been appropriated \$3,700,000 leaving \$781,456 still to be appropriated if the original limit of cost is not to be exceeded.

With the funds appropriated the work at the main entrance has been completed, and the main breakwater has been built or contracted for to a length now regarded as the limit contemplated by the previous appropriation acts. Out of the amount appropriated \$75,000 has also been reappropriated for other purposes, and there is an unpledged balance in hand of about \$81,000, made up of the unexpended balances of funds allotted for breakwater construction under previous contracts. It is therefore evident that if no further extension of the breakwater is authorized by Congress it will be possible to complete the entire work within the limit of cost first proposed. That this is true is largely attributed to the very favorable prices obtained for a large part of the work. With the nearing completion of the breakwater extension it becomes necessary to determine definitely the manner of effecting the projected closure of the easterly end of the harbor—the problem involved in the present examination. I am of the opinion that ultimately a shore arm will be required to protect the eastern end of the east basin from the prevailing winds and to render available the docks which may be built in that locality.

A solution of the question which is proposed by the city of Cleveland appears worthy of serious consideration. Gordon Park, which is owned by the city, is situated just east of what, according to the present general plan, would be the limit of the harbor. Emptying into the lake within the limits of Gordon Park is a small stream known as Doan Brook which, improved sufficiently to form a small harbor, is extensively used by small pleasure craft. The city officials desire to provide a more adequate harbor, but do not feel justified in undertaking any extensive improvement unassisted, and it is understood by them that the use which would be made of this harbor is not itself such as to warrant expenditure for its construction on the part of the United States. They propose, however, that the city cooperate with the General Government to complete the easterly end of Cleveland Harbor after the following plan: The United States to abandon its project to construct a detached breakwater running shoreward from the westerly limit of Gordon Park and apply the funds which would otherwise be required for this work to extending the present breakwater easterly. The city would then undertake the construction of a pier which would begin on the shore at a point near the easterly limit of Gordon Park and extend in such a direction and for such a distance as would meet the Government breakwater, allowing for

openings required for a harbor entrance and for sanitary reasons. The pier which the city would build is designed to be some 200 feet in width, to provide for driveways and for parking, and would consist of a fill between permanent bulkheads. It is believed that the adoption of this plan would ultimately be mutually advantageous to the United States and to the city of Cleveland. Without increasing the cost of the project the Government would be able to provide a more extensive harbor than at present planned. While the additional protected frontage would probably not be commercially developed, increasing the area for maneuvering and anchoring vessels would add to the advantages of the harbor. Another advantage gained by the United States would be the following: If the United States should construct the shore arm, it is to be expected that the shore arm would so modify the currents in its vicinity as to cause erosion of the shore at or near its extremity, thereby involving the United States in possible claims or damages. If the city of Cleveland constructs the shore arm, it will be responsible for such damage. The city would greatly improve Gordon Park by having its water front protected. The owners of small craft would derive a large benefit from the proposed arrangement. No part of the frontage now protected by the breakwater is available for their use, and the harbor within Gordon Park is too exposed and restricted to afford the facilities required by them. Another advantage of importance would be that a considerable amount of dredged material could be used in the construction of the pier. Dredged material is ordinarily dumped in authorized grounds located well off shore at considerable distances from the harbor entrance, this disposition adding materially to the cost of dredging. Suitable material from the river and outer harbor could doubtless be deposited at the pier site at a comparatively low cost because of the shorter haul and the partial protection from storms which would be afforded.

9. While it appears highly desirable for the United States to take advantage of the city's offer to cooperate, it is not believed that the commercial needs of the harbor warrant proceeding with the work immediately. As stated earlier in this report, only that portion of the outer harbor west of East Ninth Street has as yet been utilized, and this frontage is well protected by the breakwaters already built. The present trend is toward the development of the inner harbor, particularly in the upper river valley.

During 1912 about 54 per cent of the total business of the port was handled in the inner harbor, and of this amount about 65 per cent was handled at docks above Superior Avenue Viaduct. The city has been engaged in the improvement of the river in connection with this development, and the United States has under consideration a plan for extensive river straightening. There can be no doubt that the outer harbor will eventually grow, also that before it can be fully utilized it must be protected in some manner at its sterly end, but this growth and the consequent necessity for completing the breakwater does not appear imminent. In view of the city's position, however, it is believed desirable for the United States to definitely modify the existing project, deferring actual construction until conditions become such as to warrant it. Until the Government's plans are definite the city can not design their pier in conformity therewith nor undertake their part of the work, but if their

proposal is adopted they state that they are prepared to begin construction of the pier at once and estimate that it can be completed within four years.

10. In view of the foregoing, I recommend that the project for improving Cleveland Harbor be modified by omitting therefrom provision for the construction of a shore arm of the breakwater near the westerly line of Gordon Park, and by authorizing the further extension of the east breakwater in prolongation of its axis for such distance as the funds estimated to be required for constructing this shore arm, according to the existing project, will permit: *Provided however,* That no part of the funds that may be appropriated for the construction of the east breakwater extension shall be expended until satisfactory assurances shall have been received by the Secretary of War that the local authorities will construct, at their own expense, a pier in lieu of the breakwater shore arm. It is believed that the present and prospective commerce of the harbor render it worthy of improvement by the General Government to the extent above recommended.

11. There are no questions of water power involved nor any form of cooperation other than that proposed which will lessen the cost of the improvement.

CHAS. S. BROMWELL,  
Major, Corps of Engineers.

[First indorsement.]

OFFICE DIVISION ENGINEER,  
LAKES DIVISION,  
Buffalo, N. Y., August 7, 1913.

To the CHIEF OF ENGINEERS:

1. As stated in the third section of paragraph 8 herein, the east breakwater has been extended, or is being extended under contract in force, to a length now regarded as the limit contemplated by act of Congress for such extension under the existing project; and there is an unpledged balance of funds in hand of about \$81,000.

2. It is believed that the acts of Congress further contemplate that the construction of pierheads and a breakwater shore arm at the east end, estimated for in the project document, were not to be provided for; that the project should now be considered as completed; and that the further improvement required to be considered herein should be regarded as a new project.

3. As stated in paragraph 5 herein, the outer harbor development has been almost entirely confined to that portion west from East Ninth Street, and east of that street there is but one commercial dock in the whole length of 16,500 feet of breakwater extension.

4. While there may be development of the outer harbor for commercial use, such development will in all probability be very gradual and protection therefor by an easterly shore arm will not be needed for a long time to come. The desire for further improvement at the present time can therefore fairly be regarded to be not in the interest of commerce, but in the interest of the city of Cleveland to develop and protect a pleasure-boat harbor at Gordon Park.

5. In view of the foregoing, it is recommended (in modification of the recommendation of the district officer in paragraph 10 herein) that there be no further construction under the present project of a breakwater for the protection of the east end of the outer harbor at Cleveland, Ohio, and that the further improvement at the locality by the United States be limited to further extension of the east breakwater in prolongation of its axis for such distance as may be required to meet a pier proposed to be constructed at the east end of Gordon Park: *Provided, however,* That no funds on hand or that may be appropriated for such breakwater extension shall be expended until satisfactory assurances shall have been received by the Secretary of War that the local authorities will construct, at their own expense, a pier in lieu of a breakwater shore arm.

6. It is believed that improvement to the extent above recommended should not be considered worthy until there has been some actual development for commercial purposes of the east half of the east outer harbor.

J. G. WARREN,  
*Colonel, Corps of Engineers.*

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[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,  
September 9, 1913.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

For the reasons stated herein, the board concurs substantially with the district officer and recommends a modification of the project for the east end of the outer harbor at Cleveland, Ohio, by omitting the shore arm breakwater originally proposed and extending the east breakwater in prolongation of its axis approximately as shown on the map<sup>1</sup> accompanying the district officer's report on condition that the city of Cleveland shall construct a pier approximately as shown on said map. The board believes, however, that the plan should be made definite both as to length of extension and estimate of cost in so far as Government work is concerned, and it therefore commands that the district officer be authorized to submit a plan showing definitely the length of additional extension proposed and to give an estimate for its cost of construction.

For the board:

W. M. BLACK,  
*Colonel, Corps of Engineers,*  
*Senior Member of the Board.*

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LETTER OF DIRECTOR OF PUBLIC SERVICE OF CLEVELAND, OHIO.

CITY OF CLEVELAND,  
DEPARTMENT OF PUBLIC SERVICE,  
June 18, 1913.

DEAR SIR: Regarding the completion of the east breakwater and shore arm, I beg to state that my understanding of the present plan is that the main breakwater is to be extended easterly to a point approximately opposite the westerly limit of Gordon Park, all after leaving a suitable opening between the easterly end of the main breakwater

<sup>1</sup> Not printed.

a shore arm is to be constructed toward the shore until a depth of water of 12 feet is reached.

Instead of this plan I beg to respectfully request that the present breakwater be extended easterly as far as the estimated cost of the shore arm will permit. If this is done the city will build a pier or shore arm from the present shore line to within such distance of the breakwater as in your judgment will leave the proper width of opening. This plan would involve no additional expense on the part of the Federal Government and would have the advantage of affording a larger harbor than the present plan, which harbor would be completely protected by having a shore arm built clear to the shore instead of to a depth of water of 12 feet. This would have an additional advantage of providing a driveway and walks on the pier, which could be a very attractive and useful part of our park and boulevard system.

I propose to ask the council to make an appropriation of sufficient funds to provide for the construction of about 600 feet of this pier. Our plan contemplates building the pier at a point about 400 feet east of the Gordon Park bathhouse. This work could be done within the next year, and as soon as we can have definite information about the actual location of the extended breakwater (should the Government decide to make such extension) we will then make further appropriation and extend the shore arm pier to such point as you may approve. I would think that the entire work could be completed within four years.

Your favorable consideration of this plan of cooperation between the Federal Government and the city is heartily solicited.

Respectfully submitted,

W. J. SPRINGBORN,  
Director of Public Service.

Maj. CHARLES S. BROMWELL.

**MINUTES OF PUBLIC HEARING HELD IN THE UNITED STATES ENGINEER OFFICE  
FEDERAL BUILDING, CLEVELAND, OHIO, TO CONSIDER THE QUESTION OF HARBOUR  
IMPROVEMENT AT CLEVELAND, WITH A VIEW TO THE COMPLETION OF THE EAST  
BREAKWATER AND SHORE ARM.**

The meeting was called to order by Maj. Charles S. Bromwell at 2.55 p. m., Wednesday, June 18, 1913, in response to public notice dated June 11, 1913.

Maj. BROMWELL. A provision in the river and harbor act of March 3, 1913, authorizes a preliminary examination of Cleveland Harbor, with a view to determine whether or not the city is willing to cooperate with the Federal Government in the construction of the East Breakwater. Funds have been appropriated to extend the East Breakwater, but no funds have been appropriated for the construction of a shore arm. Such construction is, undoubtedly, a part of the project, but it is not specifically mentioned as a part of the project. It is understood that the city is anxious to cooperate with the General Government by constructing a shore arm, starting at some point about the bathing beach at Gordon Park, provided the Federal Government will use the funds which would be necessary for the construction of the shore arm in extending the East Breakwater as far as funds will carry it. The purpose of this meeting is to hear from the city officials whether or not they have agreed upon the plan which will provide for the construction of this shore arm, the necessary funds to carry on the work, and what extent they will cooperate.

Mr. W. J. SPRINGBORN, director of public service, in response to a request by Maj. Bromwell to make a few remarks on the subject, stated: I wish to say the city is willing to cooperate in the building of a suitable harbor, and if the Federal Government will extend the breakwater in an easterly direction parallel with the shore in place of building the shore arm, that the city will build a shore arm, or at least a pier that will take the place of a shore arm, so that the shore arm will not be necessary as far as the Government is concerned. The city at this time is very anxious to provide a harbor of this kind in front of Gordon Park to accommodate the increasing number of motor boats now using Doan Brook within the park as an anchorage, and I realize that this in itself would not be regarded by the Government as a sufficient reason for the expenditure of funds, but it appears proper to ask the Government to expend an amount not to exceed that originally proposed in such manner as to benefit the city and at the same time afford full protection for the navigation interests for which the harbor is provided. Motor-boat owners have for a long time been asking for a better anchorage than Doan Brook, and the city believes they are entitled to better facilities. The plan that the city has worked out and is willing to carry out would be the building of a shore arm extending out toward the breakwater. This proposed shore arm or pier will be about 200 feet in width, with a drive and walks, terminating in a small island.

nd I believe that with the increased use of our water front parks any development of these parks would be a wise expenditure. We no longer think of Cleveland as a city of 700,000, but most of us realize it is only a question of a short time before the population will be 2,000,000; when that time comes our park system will be none too large. A driveway 200 feet wide would answer for a shore arm, because it would make quiet water. The question as to the width of the opening there, we will leave entirely to you. What we want is clean water in front of the parks on account of bathing beaches, and ample space for harboring our boats. We are prepared now to ask the council for an appropriation, and will ask for an appropriation of \$30,000, which we believe will be sufficient to build the first 600 feet of the pier, as we believe it is wise to stop at about 600 feet until we know what the Government will do.

Maj. BROMWELL. How rapidly would the city be prepared to follow up this work should the Government decide to cooperate and appropriate money for extending the east breakwater?

Mr. SPRINGBORN. As soon as the Government plans are definite. If the Government plans can be definitely determined within a year's time so that the city would have an opportunity to design the remaining portion of the pier in harmony therewith, I think the pier could be completed within four years; by that I mean we would construct a section each year, with the possible exception of some of the fill in the east end of the shore arm; the west fill could be made as desired. I am quite sure that four years would be ample time for securing this money and making the improvement. The mayor and other officials are heartily in favor of it, and we have been waiting what might be done before we took active steps.

Maj. BROMWELL. Is there present a representative of the Cleveland River and Harbor Commission?

Mr. MORDECAI, member of the Cleveland River and Harbor Commission. I think it would be the advisable thing to do to follow out the plan as proposed by the city for a harbor in front of Gordon Park, which is now a very important park, and at the same time it would fully protect the boats lying inside of the breakwater. The commission did not go into the question whether or not it was necessary to make this improvement, but I think a majority would like to see a shore arm built.

Maj. BROMWELL. Has the commission considered the building of any shore arm at the easterly end of the harbor?

Mr. MORDECAI. I do not think it has; however, the commission was very clear of the opinion that they thought it would be wiser if the breakwater would be extended eastward; that is, if the money that is spent in building the shore arm as it is proposed could be used for extending the breakwater easterly.

Maj. BROMWELL. Mr. Hoffmann, have you anything to say?

Mr. ROBERT HOFFMANN, city engineer. Some time ago, I think when Col. Millis was stationed here, I expressed my approval of a tentative plan for closing the east end of the Cleveland Harbor by extending a shore arm northerly from the front of East Twentieth Street. At the time of making that approval it was understood that no other plan could be considered by the Government, and at this time, in view of the fact that the question still appears to be open, I wish to recall this approval of the former plan in favor of the plan of constructing a harbor off Gordon Park, as proposed by the city.

Maj. BROMWELL. Mr. Thomas, do you wish to make any remarks?

Mr. E. B. THOMAS, assistant city engineer. There is one other point in favor of the city's plan which appears to me to be a very good one, and that is it includes the connection of a shore arm extending the entire distance to the beach, thus affording more complete protection to the harbor than would be had by a shore arm constructed only within 600 to 700 feet of the beach as originally proposed by the Government.

Maj. BROMWELL. Anybody else wishing to make a few remarks?

Mr. LYMAN. I am heartily in favor of the city's plan, but believe, however, that two openings should be left in the east and west portion of the breakwater some distance from its easterly end to permit vessels to enter during westerly squalls, but should be a sufficient distance away from the shore arm to afford ample sea room. These openings should be left in the breakwater to provide for a free circulation of water and to eliminate any possibility of stagnation. I have sailed these lakes for about 40 years, and it is to me that building the arm out from Gordon Park would be better than extending the shore arm, but in my opinion I would prefer to have the arm left out altogether; if one is built I think it would be the best policy to build it square out from Gordon Park and not at an angle, as I understand has been proposed, as the race of seas along a long structure is very dangerous to vessels navigating in the vicinity.

Maj. BROMWELL. Mr. Springborn, has the city considered any possible objection to building the easterly end for sanitary reasons?

Mr. SPRINGBORN. We have considered that question, and it is not anticipated that any would arise along that line providing the proper openings are left in the breakwater. Practically the only sewage discharging in this vicinity is the overflow water from the sewage emptying into Doan Brook, but if this discharge develops to be objectionable it could be diverted to a point outside of the harbor by the construction of a tunnel. I believe that Mr. Lyman's suggestion that two openings should be left in the breakwater is worthy of consideration, and I wish to emphasize the statement made by Mr. Hoffmann that the commercial development of the easterly end of the harbor is to be anticipated. It has frequently come to my attention that manufacturers located between East Twenty-sixth and East Seventieth Streets are anxious to construct piers and docks as soon as the harbor has advanced sufficiently to afford them proper protection. Some years ago the American Steel & Wire Co. took up with me the question of leasing one of the city's piers at the foot of East Ninth Street for the purpose of loading nails on vessels, but abandoned this plan with the idea of waiting until they could construct a dock in front of their own property.

Maj. BROMWELL. Perhaps the unsettled question of the establishment of harbor lines in the east basin has been responsible for some delay in these developments.

Mr. SPRINGBORN. That probably is the cause of some delay, but I believe that the delay has been occasioned more particularly by the present lack of adequate shelter for such docks. In behalf of the city I wish to thank you, Maj. Bromwell, for your prompt action in all matters concerning the city and the Federal Government. We want to assure you we appreciate your help in cooperating with the city in all the matters.

Maj. BROMWELL. If there are no further remarks on this subject the meeting will adjourned.

(Meeting adjourned at 3.30 p. m.)

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#### SURVEY OF CLEVELAND HARBOR, OHIO.

UNITED STATES ENGINEER OFFICE,  
*Cleveland, Ohio, February 10, 1914.*

From: The District Engineer Officer.

To: The Chief of Engineers, United States Army

(Through the Division Engineer).

Subject: Report of survey and estimate, Cleveland Harbor, Ohio.

1. In compliance with instructions from the office of the Chief Engineers dated September 16, 1913, a report with estimate of cost is submitted as follows on a survey of Cleveland Harbor, Ohio, pursuant to a report of preliminary examination submitted July 22, 1913, "with a view to the completion of the east breakwater and shore arm including any plan for cooperation on the part of the city of Cleveland."

2. The history of the improvement of the harbor, a description of its present condition under the approved project, and statistics relating to its commerce are contained in the report of preliminary examination.

3. The preliminary report also discusses in detail a plan proposed by the officials of the city of Cleveland and favorably considered by me, viz: The modification of the existing project by omitting therefore the provision for constructing a shore arm to close the easterly end of the harbor, and by adding thereto provision for the extension of the east breakwater for such distance as the funds which would otherwise be required for a shore arm will construct, provided that the city of Cleveland build at its own expense a jetty from shore in lieu of a shore arm to be omitted.

4. Further study of the plan by the city officials has, however, resulted in changing their attitude toward it. They state that the probable cost of the pier which they had proposed to build is for

to be so greatly in excess of resources available for park purposes that the city is not now, and will not within a reasonable number of years, be able to undertake the work, however desirous it might be of so doing. They have concluded, moreover, that there is some doubt as to the desirability of proceeding with the improvement. They are apprehensive that the inclosure of the frontage of Gordon Park within the harbor might depreciate the value of, or perhaps render entirely unfit for use, the park bathing beach, on account of the pollution of the water in the basin by the discharge of sewage and waste products of industrial plants located along the shore.

5. This change of attitude on the part of the city therefore disposes of the plan of cooperation recommended in my previous report and involves further consideration of the question of "the completion of the east breakwater and shore arm."

6. The work of extending the east breakwater and creating an enlarged outer harbor was authorized by Congress June 13, 1902. The appropriation made at that time was stated to be for "Improving said harbor (Cleveland) in accordance with the report submitted in House Document numbered one hundred and eighteen, Fifty-sixth Congress, second session \* \* \*: *Provided further*, That \* \* \* the center line of such new breakwater shall be constructed upon the prolongation of the center line of the main portion of the existing breakwater." While the exact plan indicated in the House document named was not adhered to, it was apparently the intention of Congress to adopt the general plan proposed, modifying it only to the extent of increasing the area of the harbor by locating the breakwater farther from shore, and this view is confirmed by the revision in the river and harbor act approved March 2, 1907, which again appropriated money for the "prosecution of the project submitted in House Document numbered one hundred and eighteen, fifty-sixth Congress, second session, and heretofore adopted." It has therefore been the view of this office that the plan outlined in the House document above named, as modified at the time of its adoption, constitutes the approved project for this portion of Cleveland Harbor, and it is further understood that it was the intention of Congress ultimately to appropriate amounts sufficient for the completion of work in accordance therewith. It is true, however, at the exact manner of carrying out the general plan adopted, so far as the completion of the harbor at its easterly end is concerned, has never been definitely determined, although such determination is necessarily involved in the general change ordered.

7. It is therefore believed that the present survey should properly be regarded as the basis for some definite plan of completing the harbor in accordance with the general project previously adopted. What will prove to be the most advantageous plan has been the subject of much discussion for a considerable time. Prior to the enactment of the law under the authority of which the present survey has been made, the approaching completion of the main breakwater gave rise to the consideration of this problem. At that time it was assumed that the principal questions involved were: (1) How far the main breakwater should be extended eastward. (2) How wide the entrance should be left between the main breakwater and the shore. (3) How long a shore arm should be built. (4) What direc-

tion the shore arm should take. It was not anticipated, however, that there would be any question of the approximate location of the inner end of the shore arm, since this was regarded as fixed by the adopted project as a point offshore from the westerly boundary of Gordon Park. With one exception the opinions of those interested, so far as they were expressed, favored the general plan of terminating the main breakwater at a point offshore from the westerly limit of Gordon Park, providing an entrance 600 or 700 feet wide, and constructing an arm extending from the entrance shoreward. The river and harbor committee of the Cleveland Chamber of Commerce objected to this plan on the ground that the construction of a shore arm would increase the difficulty of vessels entering the harbor at that point and that the frontage which would be protected by such an arm had not been sufficiently developed to require protection. In view of the divergence of opinion no definite action was taken until under authority of the law, a comprehensive review of the whole situation could be had.

8. Under such authority the city of Cleveland at first offered to cooperate with the Government, as has been stated, but has since practically withdrawn its offer. The views of those interested having again been solicited, and a public hearing has been held, an abstract of the minutes of which accompany this report.

9. At this hearing it appeared that the river and harbor committee of the chamber of commerce is still of the opinion that it is undesirable to build a shore arm, apparently on the ground that future developments might require an extension of the main breakwater to provide a greater harbor area. The river and harbor commission of the city of Cleveland favors the protection of the eastern portion of the harbor by further prolonging the present breakwater, and express the opinion that the prolongation, some 1,800 feet, as proposed in the cooperation with the city of Cleveland would adequately protect the harbor west of Gordon Park.

10. The property owners were generally of the opinion that adequate protection of the eastern portion of the harbor was necessary before the development of that section might be expected to take place, although the representative of the Cleveland Electric Illuminating Co. stated that it would be detrimental to the interests of the company.

11. The navigation interests seem to be of the opinion that the shore arm should not be built, as it would decrease the ease of entering the harbor in stormy weather. From conversation with master of some of the large vessels operating on the lakes I ascertain, on the other hand, that in their opinion the construction of a shore arm would not be detrimental to navigation interests; that an opening of 700 feet is ample for the safe handling of vessels in bad weather, and that such an entrance to the eastward to be used in connection with the main entrance to the northwest would afford admirable facilities for entering the harbor, no matter in which direction the wind might be blowing.

12. The property owners are somewhat embarrassed in coming to a decision in this matter on account of the uncertainty of the title to the submerged land in front of their holdings. The State of Ohio has recently laid claim to such submerged land, and is preparing to enforce it in the courts. Furthermore, the absence of a harbor line

In this locality has deterred property owners from making plans for the future.

13. I can not agree with the chamber of commerce in the contention that the main breakwater may be extended in the future for the greater accommodation of the harbor, as the commercial limit of the harbor is well marked by Gordon Park, in front of and beyond which there is no chance of commercial development. All that the city of Cleveland can reasonably expect of the United States is the protection of the commercial harbor, and any plan for protecting Gordon Park or increasing the size of the harbor simply for the benefit of pleasure craft can not be favorably regarded unless the city shall bear the extra expense involved thereby. Nor can I agree with the river and harbor commission that the extension of 1,800 feet of breakwater will afford the same protection as the shore arm proposed. There will be considerable area at the eastern end of the harbor which will be exposed to winds from the north and northeast even if the breakwater was extended as proposed.

14. Just at present the trend of development in the city of Cleveland seems to be toward the upper valley of the Cuyahoga River; here, however, the area for development is limited, and it appears that after available sites have been utilized the development will be forced toward the lake front. Here it seems improbable that any great amount of money will be invested unless there is reasonable protection to the docks and terminals. It is true that there are not many storms from the northeast, but protection must be afforded against such as do occur.

15. With the completion of the main breakwater the shore is fairly well protected as far easterly as East Fortieth Street. Beyond that point the exposure from the north and northeast is so great that a shore arm of breakwater is a necessity before any extensive construction of wharves can be undertaken. It is also true that the frontage west of East Fortieth Street which is now best protected is owned largely by the Pennsylvania and Lake Shore & Michigan Southern Railway Cos., and it is believed that its development is not likely to occur in the immediate future, for the reason that both of these companies are improving their frontage in the west basin and will scarcely require additional space for some time to come. On the other hand, the frontage east of East Fortieth Street, which now lacks protection, is divided into comparatively small holdings, and it appears probable that many of the owners would be quick to take advantage of the completion of the harbor by constructing docks and availing themselves of the facilities for water transportation.

16. After carefully considering the problem, I am of the opinion that the broadest interests of the harbor will be most advantageously served by the ultimate completion of the harbor after the following-described plan, which is also indicated upon the map which accompanies this report: (1) The termination of the main breakwater at a point offshore from the westerly limit of Gordon Park, the length of the so-called East breakwater extension being thereby limited to approximately 15,650 feet, which length will be completed under an existing contract, (2) the construction of a pierhead to mark the westerly end of this extension, (3) the construction of a shore arm beginning with a second pierhead at a point 700 feet distant from the pierhead marking the end of the main breakwater, and extending

1,960 feet on a line which will be at an angle of  $113^{\circ}$  with the axis of the main breakwater, to a point at the westerly end of the harbor line at Gordon Park established by the Secretary of War July 17, 1896, (4) a spur 240 feet in length extending from the inner end of the shore arm along and just northerly from the harbor line above mentioned. This spur is intended to deflect currents developing along the shore arm and to minimize the tendency to shore erosion from this source.

The estimated cost of the work is as follows:

2 pierheads, at \$50,000 each.....	\$100, 000
Shore arm and spur:	
43,000 tons stone, at \$1.50 per ton.....	64, 500
230,000 tons stone, at \$1.25 per ton.....	287, 500
	452, 000
Plus about 10 per cent for contingencies, etc.....	45, 000
<b>Total.....</b>	<b>497, 000</b>

17. The above estimate is based upon the assumption that the shore arm and spur will be of the rubble mound type now used in this district. There is on hand from former appropriations under the approved project an unpledged balance of about \$81,000, which would be properly applicable to this work. There would thus remain to be appropriated \$416,000.

18. It is worthy of note that, although the original estimate of the cost of improvement was inferentially increased by the modification of the plan upon which it was based, the whole improvement can nevertheless be completed as above indicated, with a saving of about \$365,000 over the first estimate—due largely to the very favorable prices obtained.

19. A description of the terminals in the portion of the harbor under consideration is given in the preliminary report. There is ample room for the development of other terminals by the city and by private interests, but the cost of such development should and will be borne by those immediately interested.

20. There are no questions of water power involved or other related interests which will cheapen the cost to the United States.

21. While the plan of completing the harbor contained in paragraph 16 has been prepared in the belief that Congress desires such a plan and estimate of cost, it is thought that the present requirements of the harbor do not demand the construction of the shore arm. It is therefore recommended that the plan suggested be adopted as a definite project but no work be done in the near future except the construction of a pierhead to mark the end of the main breakwater, this pierhead being necessary to provide for the safe use of the easterly entrance by the navigation interests.

22. Should Congress approve this plan the expenditure of \$50,000 for the main breakwater pierhead should be authorized from funds now on hand, and the appropriation of the balance should be deferred till a later date. The pierhead can be built in one season. The shore arm and its pierhead can not be built in less than two seasons.

CHAS. S. BROMWELL,  
Major, Corps of Engineers.

[First indorsement.]

OFFICE DIVISION ENGINEER,

LAKES DIVISION,

Buffalo, N. Y., February 13, 1914.

To the CHIEF OF ENGINEERS:

1. Forwarded.
2. In view of the refusal of the city authorities to cooperate to the extent of constructing at city expense a pier or jetty from shore, in lieu of a breakwater shore arm, the recommendation of the district officer in paragraphs 16, 21, and 22 herein is concurred in; provided however, that the construction of the breakwater shore arm and its pierhead should not be considered worthy until there has been some actual development for commercial purposes of the east half of the east outer harbor.

J. G. WARREN,  
*Colonel, Corps of Engineers.*

[For Report of the Board of Engineers for Rivers and Harbors on Survey, see page 3.]

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ABSTRACT OF MINUTES OF A PUBLIC HEARING HELD AT UNITED STATES ENGINEER OFFICE, FEDERAL BUILDING, CLEVELAND, OHIO, ON FEBRUARY 2, 1914, FOR CONSIDERATION OF THE QUESTION OF COMPLETING THE HARBOR PROJECT AT CLEVELAND BY THE CONSTRUCTION OF A SHORE ARM FROM THE PRESENT EAST END OF THE BREAKWATER TO THE WESTERLY BOUNDARY OF GORDON PARK.

Among those present were:

Mr. Robert Hoffman, chief engineer, city of Cleveland.

Mr. E. B. Thomas, city river and harbor engineer.

Mr. Harry Gahn, secretary city river and harbor commission.

Mr. Edwin Baxter, secretary river and harbor committee of the Cleveland Chamber of Commerce.

Mr. E. C. Collins (of the Pittsburgh Steamship Co.), representing the Cleveland Chamber of Commerce.

Capt. C. E. Benham, representing vessel interests and chamber of industry.

Mr. P. L. Cobb, representing Cleveland Electric Illuminating Co.

Mr. F. A. Quail, representing Wilson Realty Co.

Mr. C. A. Krause, representing Lake Shore Saw Mill & Lumber Co.

Mr. L. F. Roether, representing Gund Brewing Co.

Mr. J. G. Bruggeman, owner of lake-front property.

Meeting was called to order at 10.30 a. m. by Maj. Bromwell.

Maj. BROMWELL stated that Congress had provided for an examination of the eastern portion of the harbor at Cleveland, with a view to possible cooperation by the city, the sea being the United States should extend the present breakwater some 1,800 feet to a point about opposite the middle of Gordon Park, and that the city should then build a shore arm from that point out to the extremity of the breakwater, leaving an opening for vessels. All interests concerned seemed to agree that this would be a desirable improvement, both for the United States and for the city. But the city authorities, when they came to determine the cost of the improvement, found that the cost apparently would be out of proportion to the benefits that would be derived, and they have therefore practically withdrawn their offer of cooperation, leaving the matter now entirely a question of what the United States shall do. The original plan, which was proved by congressional legislation, provided for a shore arm at the point shown on the map—that is, starting at a point opposite the westerly end of Gordon Park, extending out toward the end of the breakwater, leaving an opening for vessels. The purpose now is to find out whether the navigation, shipping, and other local interests think it advisable for the United States to proceed on the plan proposed a number of years ago, and this meeting is for the purpose of getting the views of the various interests concerned.

(Called on Mr. Hoffman for the views of the city authorities.)



LAKE

ERIE

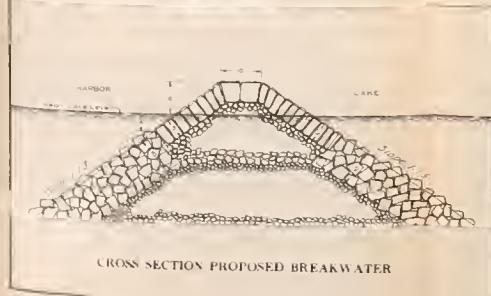
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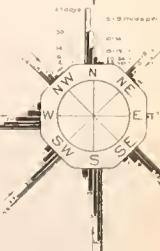
#### CROSS SECTION PROPOSED PRELIMINATED



#### DIRECTION AND VELOCITY OF WIND

1912

Scales  
Length days ~~in miles~~?  
Breadth miles per hour ~~in miles~~?  
Data furnished by the Cleveland Office  
U.S. Weather Bureau, where it is filed.



CLEVELAND HARBOR, OHIO  
PROPOSED IMPROVEMENTS

**PROPOSED IMPROVEMENT  
TO ACCOMPANY REPORT OF SURVEY MADE  
UNDER AUTHORITY OF THE RIVER AND HARBOR ACT  
OF MARCH 4, 1913.**

OF MARCH 4, 1913

**U.S. Engineer Office**      **Cleveland, Ohio**  
*Scale of Feet*

Drawn by 9-22 Traced by JES Checked by 9990

Approved February 10, 1914 and forwarded with report of same date

*Mary Brownell*

Major, Engineers

*Note*: All depths referred to mean lake level 1860-1875, elevation 512.83

above mean tide at New York  
6 ft contour 1000 18 ft contour

6 ft contour      12 ft contour      18 ft contour

House Doc. No. 891; 63d Cong., 2d Sess.

